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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/537,962
Filing Date: June 09, 2005
Appellant(s): HAUBNER ET AL.

Bryant L. Young
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 31st Dec 2007 appealing from the Office action mailed 25th Sep 2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

EP 1 361 243 A1	Kodama et al	12-2003
5,395,959	Weyer et al	03-1995

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Kodama et al** (EP 1 361 243 A1) in view of **Weyer et al** (US 5,395,959).

Kodama et al teach a method of preparing oxytetramethylene glycol copolymer (i.e., polyoxyalkylene glycol) by copolymerizing tetrahydrofuran and neopentyl glycol in presence of heteropolyacid catalyst [see claim 2]. This method further comprises a saturated hydrocarbon in the reaction mixture [see claim 5]. **Kodama et al** also teach the preparation of oxytetramethylene glycol copolymer, which has a specific number

average molecular weight from 800 to 5000 [see claim 1]. **Kodama et al** also teach that a copolymerization reaction, in which an inorganic acid (i.e., heteropolyacid) as a polymerization catalyst, THF and a diol as raw material monomers and a reaction terminator are used. A specific example of reaction terminator used in the said copolymerization reaction is water [see 0079 in page 16].

The difference between the instant application and **Kodama et al** is that **Kodama et al** do not expressly teach the termination of the polymerization reaction by adding water and/or measuring the electrical conductivity of the copolymerization mixture. **Kodama et al** teach the preparation of oxytetramethylene glycol copolymer, which has a specific number of average molecular weight from 800 to 5000, but silent on method of determining the molecular weight and termination of polymerization reaction, whereas in the instant application the attainment of molecular weight is determined by measuring electrical conductivity of the copolymerization mixture and termination is achieved by adding water.

With regard to the termination of polymerization reaction by adding water and measuring the electrical conductivity of a polymer, **Weyer et al** teach a method for the heteropolyacid catalyzed polymerization of monomeric reactants (i.e., THF and RH, where R may be, for example, a hydroxyl group, any aliphatic, aromatic or aromatic alcoholate group or any aliphatic, aromatic or araliphatic acyl group) to produce a polyoxyalkylene glycol in the presence of proton donor or water [col.13, lines4-10 & col.14, lines 4-6], with an average molecular weight of from about 500-3,500 dalton [col.14, lines 27-30], and this reaction system is regulated in the course of reaction by

the measurement of the electrical conductivity, which means electrical conductivity is related to molecular weight of polymer.

It would have been obvious to one of ordinary skill in the art, in view of the cited prior art references, to utilize the electrical conductivity measurements and water as polymerization terminator as taught by **Weyer et al** to control the molecular weight of copolymer in polymerization process of **Kodama et al**, with a reasonable expectation of success. One of ordinary skill in the art, desiring to arrive at other alternative methods of producing polyoxyalkylene glycol having molecular weight of 1000 to 2800, would be motivated to combine the teachings of **Kodama et al** and **Weyer et al**.

Some limitations in the present dependent claims may not be expressly taught in Kodama et al and/or Weyer et al. However, these limitations appear to be drawn to tweaking the process conditions, particularly reaction electrical conductivity range for terminating the process. Changing such parameters is prima facie obvious because an ordinary artisan would be motivated to optimize a process. Merely modifying the process conditions such as reaction conditions is not a patentable modification absent a showing of criticality.

(10) Response to Argument

Appellant argues that: (i) none of the cited prior art suggest the claimed approach of copolymerization of THF and the use of water to terminate the copolymerization, (ii) **Weyer et al** does not describe or suggest adding water to the reaction mixture in order to terminate polymerization, and (iii) the discovered claimed process provides unexpected benefits regarding the preservation of heteropolyacid catalyst. For instance, when the reaction is terminated without adding water, the recovered heteropolyacid phase became solid after 3 days, could no longer be recycled and could no longer be reused.

The Examiner disagrees with appellant arguments. **Kodama et al** clearly teach a copolymerization reaction in which an inorganic acid catalyst (preferably a heteropolyacid catalyst), THF and a diol (as raw material monomers) and a reaction terminator are used in the reaction. **Kodama et al** teach that a specific example of a reaction terminator, used to terminate the copolymerization reaction, is water [see 0079 in page 16]. **Weyer et al** also teach a method for the heteropolyacid catalyzed polymerization of monomeric reactants to produce a polyoxyalkylene glycol in presence of proton donor or water [see col.13, lines4-10 & col.14, lines 4-6]. **Weyer et al** also clearly teach that the complete addition of the proton donor R-H, wherein R is a hydroxyl group, at the polyoxyalkylene chain being formed causes chain termination in the polymerization reaction [see col. 1, lines 66-68 & col. 2, lines 32-35].

With regard to the appellant unexpected results argument, the results from the applicants' process are not unexpected because termination of polymerization by water is clearly suggested by the cited references. Therefore, the preservation of heteropolyacid catalyst would have been realized from the teachings of prior art.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Sudhakar Katakam

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